

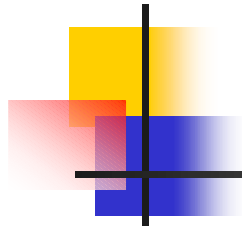


# Integration of Wind Energy Into the Wholesale Supply Portfolio\*

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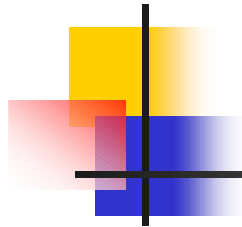
*\* Or, Congratulations on the Wind Deals – Now What Will You Do With the Energy?*



# Exelon Power Team

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- Schedules & markets Exelon Corp.'s generating assets:
  - Nuclear: 13,949 MW
  - Fossil: 3,721 MW
  - Hydro (incl. Pumped Storage): 1,489 MW
  - Long-Term Contracts: 13,900 MW
  - Renewable: 320 MW



# Exelon Power Team

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- Sells full-requirements energy and capacity to distribution company loads in Philadelphia and Chicago (approx. 32,000 MW at the peak hour)
- Does all supply and demand planning



# Renewable Portfolio

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- Wind: 150 MW
- Landfill: 100 MW
- Biomass: 20 MW
- Scrap tires: 16 MW
- MSW: 35 MW
- Hydro (not incl. pumped storage):  
525 MW



# Why is Power Team pursuing renewable assets?

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- Customer demand (natural and mandated)
- Portfolio diversity
- Image benefits
- It's the right thing to do – supply/demand concerns addressed by variety of supply- & demand-side measures



# Why are developers pursuing Power Team?

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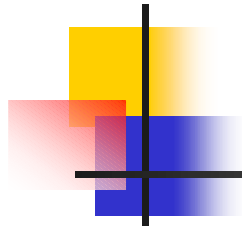
- Creditworthiness
- Large supply portfolio – capable of integrating smaller projects
- Willingness to take on long-term market value risk
- Major player in retail access markets
- Largest physical mover of power in U.S. – we have no problem picking up energy at generator bus



# Wind energy projects: getting to the PPA

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- Seller's requirements
- Buyer's requirements



## Seller wants:

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- Creditworthy partner
- Long-term commitment
- Non-conventional view
- Willingness to work jointly with transmission provider
- Willingness to not stop at one project





## Buyer wants:

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- Creditworthy partner
- Development track record
- Commitment to commercial operation date
- Output guarantee
- Willingness to dictate to transmission provider
- Payment based on production only
- Attorney who's familiar with PPA routine



# Obstacles to progress

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- In non-RTO areas, delivery imbalance
- ISO recognition of projects as capacity resources
- Is customer demand sustaining?
- The big one: cost



# Imbalance Issues

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- In non-RTO/ISO areas: transmission providers typically want to view wind generation in conventional framework (block schedule, NERC tag, OATT imbalance tariff)
- Existing ISOs (PJM, NY, CA, NEPOOL) have different approaches to wind generation, or are in the process of formulating positions



# PJM Approach

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- In PJM, existing energy markets and generator metering system make it relatively easy (i.e., non-punitive) to sell intermittent energy
- Big problem: PJM's generator notification requirement doesn't work for wind



# Possible Solutions

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- Treat wind generation as “negative load”
  - Ancillary services issue: Load pays for regulation and other services
- Develop reliable wind forecasting: First specified equation to forecast hourly wind output



# Interim Approaches

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- “First generation”: negative load concept (PJM); wide deadband (TX); day-ahead schedule modification (NY)
- “Second generation”: wind forecasting with automation to transmission provider systems



# But As More Wind Generation Is Built . . .

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- Interim solutions may have to be modified to accommodate larger-scale fluctuations
- U.S. transmission providers haven't had to tackle this issue in a big way yet



# Obstacles to progress

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- └ In non-RTO areas, delivery imbalance
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# Where to go from here

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- Risk-sharing – if subsidies are limited or non-existent, power marketing can't take on all market value risk. Ideas:
  - Insurance products (financial put options, standard coverages) to shed some risk
  - Linkages to large, creditworthy buyers who want long-term agreements or call options